Wavefront Control for High Performance Coronagraphy on Segmented and Centrally Obscured Telescopes

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Develop a highly accurate and efficient technique to measure fine cophasing errors in a starlight suppression system on segmented apertures. Principle (shown below): **use starlight otherwise rejected by the coronagraph Lyot mask to measure cophasing errors**.

- no wavefront modulation required → **does not negatively impact science instrument our other wavefront control loop(s)**
- linear sensor using a single image → **fast control loop**
- starlight photons are abundant → **sensitive measurement of fine cophasing errors**
- **compatible with most high performance Lyot coronagraphs** (PIAACMC, Vortex, Band-limited Lyot), and can be generalized to other internal starlight suppression system architectures

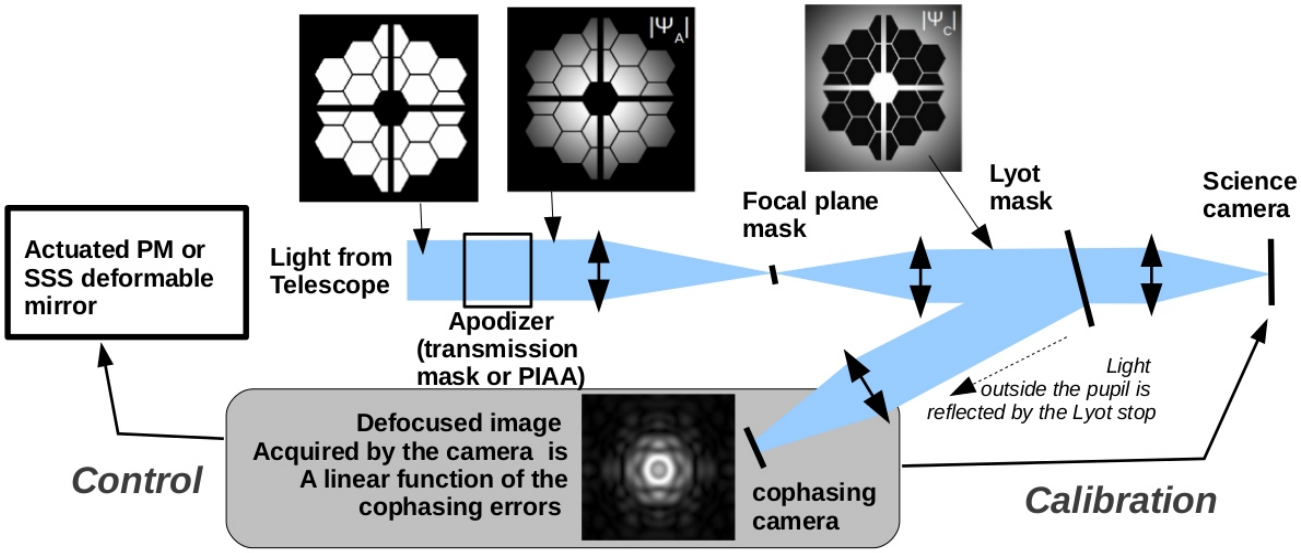

Figure above shows the segment cophasing sensor concept. The coronagraph (top part of the beam) is designed for the centrally obscured segmented aperture. Light is reflected by the Lyot mask to the cophasing camera. The measured cophasing errors can be used both for active correction (left) and calibration of the focal plane image (right).